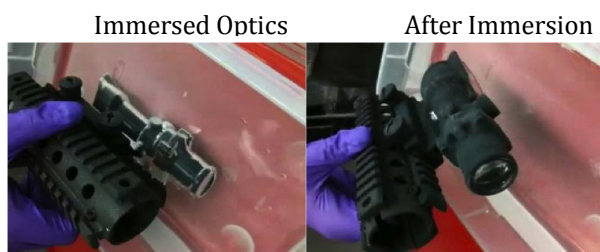


Superhydrophobic Coatings Program

The Oak Ridge National Laboratory (ORNL) has been developing and testing novel superhydrophobic coating technologies for the Department of Defense that can be used on military sensors and optical systems to increase their operational performance.

Superhydrophobic (SH) coatings are both extremely water repellent and durable, and can be coated onto a variety of surfaces to prevent surface wetting and corrosion.

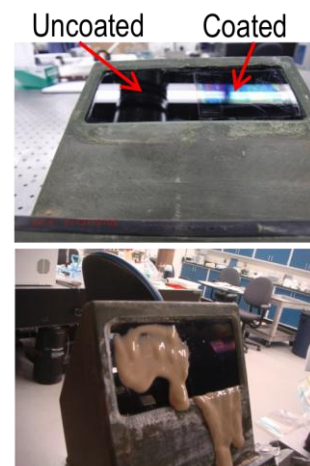


Rifle site during and after water immersion
Site and optics emerge completely dry

The photos show a typical military application. A rifle site mounted on rifle housing is immersed and retrieved from a container of water. Note the white mirror reflection surface, formed by a pinned layer of air, on the rifle site while it is immersed in the water. The exterior surface of the rifle site and the optics remain completely dry after the site has been retrieved from the water.

Both the optically transparent and exterior surface coatings are based on nanostructured silica particles, which are treated with a low surface energy coating, and blended into standard commercial and military paints, epoxies, and clearcoats. These modified coatings can then be applied to surfaces using standard paint spraying or dry powder coating techniques, to coat surfaces of structures that can be of any size.

The images to the right show an optically transparent coating that has been applied to one side of the upper window of a military vehicle's periscope. Water, mud, dirt, bird droppings, etc. will stick to the untreated window surfaces, but not to the SH coated surfaces. Additionally, these coatings can exhibit significant anti-reflection properties, increasing the amount of transmitted light, and reducing unwanted reflection and glint from the optical surfaces. ORNL expects superhydrophobic coatings will have similar advantages when used for civilian applications.



SH Coating repels mud from periscope.